

(12) UK Patent Application (19) GB (11) 2 281 535 (13) A

(43) Date of A Publication 08.03.1995

(21) Application No 9416541.2

(22) Date of Filing 16.08.1994

(30) Priority Data

(31) 935973

(32) 16.08.1993

(33) ZA

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(51) INT CL⁶

G03G 13/16, B41M 5/035

(52) UK CL (Edition N)

B6C CSSM C305 C306 C315 C32X

B6A AC12 AC13 AC21 AC31 AC62 AC72 ATC

(56) Documents Cited

GB 2273466 A EP 0410800 A2 WO 83/04092 A1

(58) Field of Search

UK CL (Edition M) B6A ATC, B6C CSSM

INT CL⁵ B41M 5/025 5/03 5/035 5/34, G03G 13/14
13/16

ONLINE DATABASES:WPI

(54) A method of producing a personal information-bearing card

(57) A method of producing a personal information-bearing card, eg an ID card, includes printing an image (12), minor image fashion, by means of a laser printer (18) onto a surface (20) of a thermoplastic polyester (eg PET) carrier film (22) which has a thickness of 70 - 150 μm ; placing said image-bearing surface on and in flat abutment with a surface of a polymeric receiver substrate (24); and applying heat and pressure to the carrier film and the substrate while in flat abutment with each other thereby transferring the image from the carrier film onto the abutting surface of the substrate. The transfer is effected at a temperature of 135 °C - 170 °C. The substrate may be of a thermoplastic polymeric material, eg PVC, having a melting point of 90°C - 200°C, or may be in the form of a preproduced blank card. The carrier film is removed from the substrate after image transfer and the substrate is then laminated with at least one sheet of transparent material.

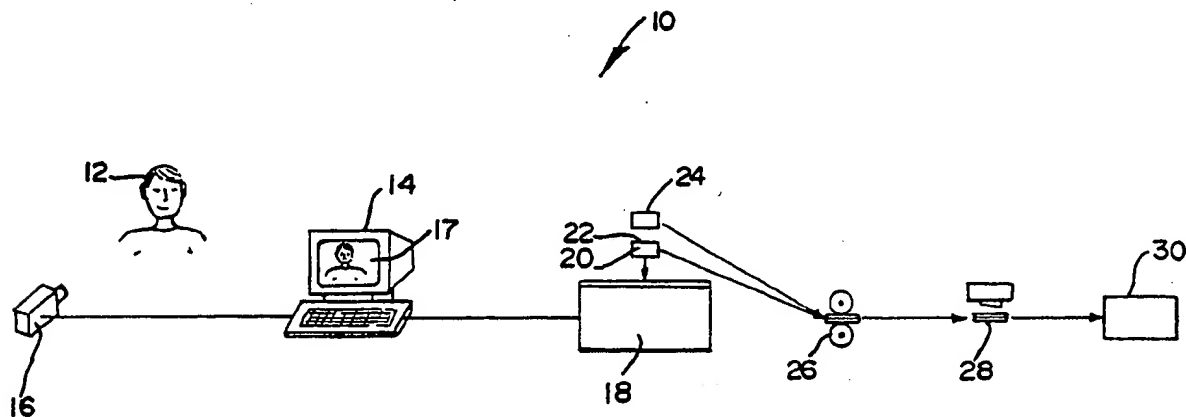


FIG 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1990.

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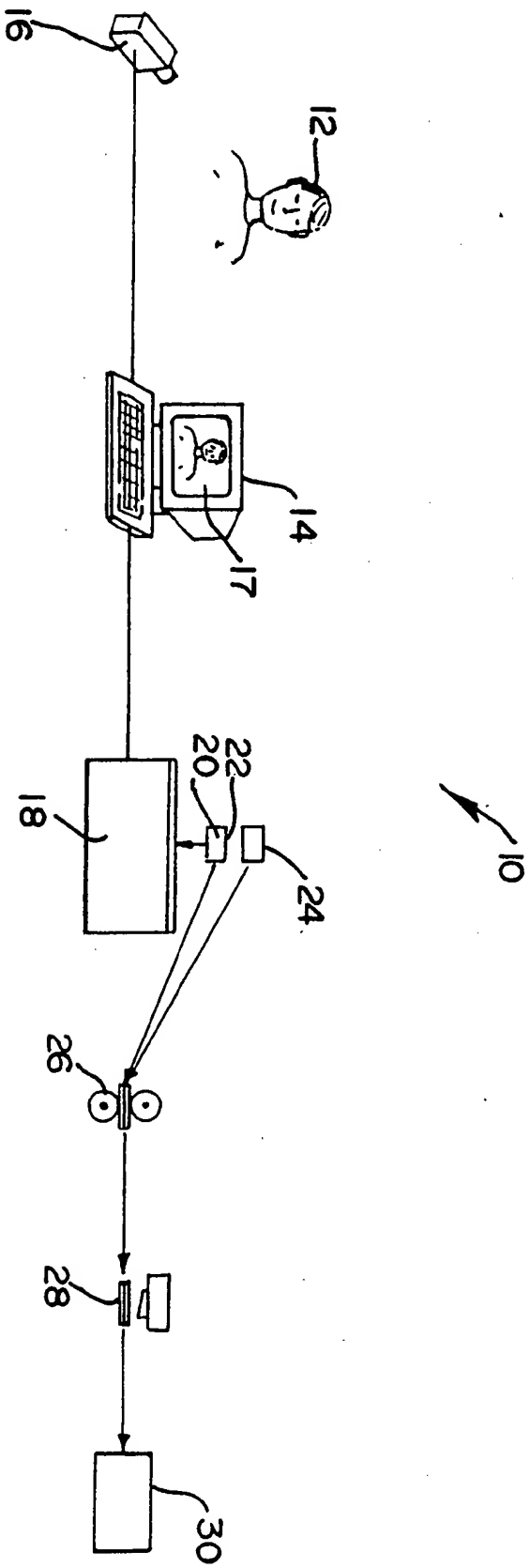
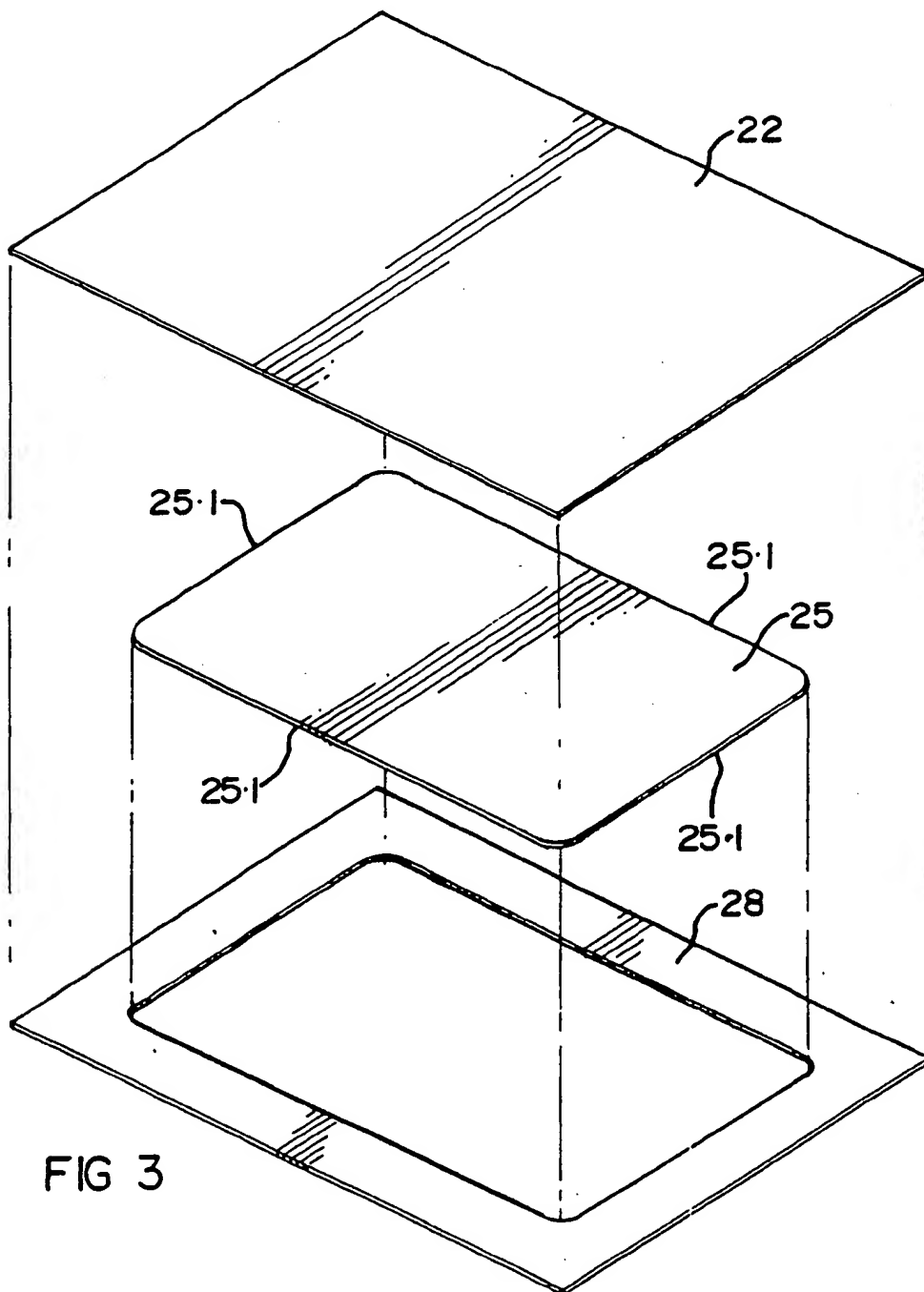
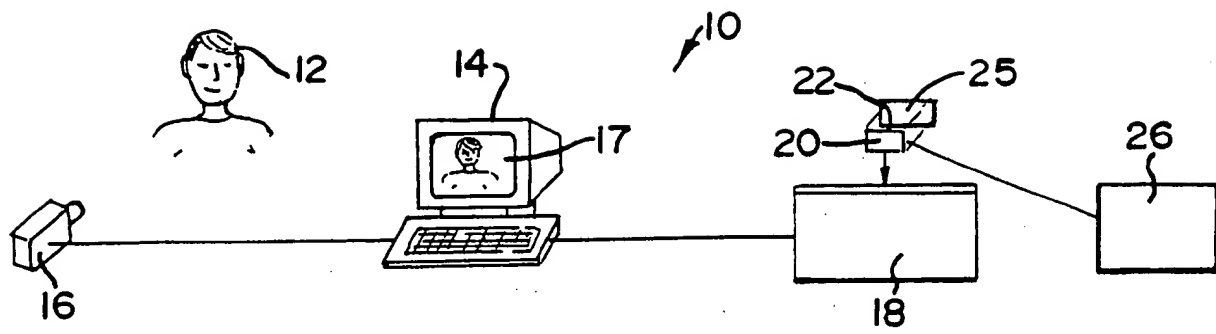


FIG. 1



A METHOD OF PRODUCING A PERSONAL INFORMATION-BEARING CARD

THIS INVENTION relates to a method of and apparatus for producing a personal information-bearing card.

In accordance with the invention, there is provided a method of producing a personal information-bearing card, the method including

printing an image, mirror image fashion, by means of a laser printer onto a surface of a thermoplastic polyester carrier film which has a thickness of 70 - 150 μm ;

placing said image-bearing surface on and in flat abutment with a surface of a polymeric receiver substrate; and

applying heat and pressure to the carrier film and the substrate while in flat abutment with each other thereby transferring the image from the carrier film onto the abutting surface of the substrate wherein the transfer is effected at a temperature of 135 °C - 170 °C.

By a personal information-bearing card is meant a card such as an identity card, driver's licence card, banking card, credit card or the like.

The substrate may be of a thermoplastic polymeric material having a melting point of 90°C - 200°C eg PVC, or the like.

The image may be transferred onto the surface of a substrate which is in the form of a pre-produced card blank. The method may include locating a containing frame around the blank card prior to applying heat and pressure thereby to minimise deformation of the card.

The pre-produced card blank may be of a thermoplastic polymeric material having a melting point of 90 - 200°C. A suitable thermoplastic polymeric material is polyvinyl chloride (PVC) or a polycarbonate.

The method may include removing the carrier film from the substrate after image transfer and then laminating the substrate with at least one sheet of transparent material.

Typically, the method includes laminating the substrate with at least one sheet of a transparent material similar to the substrate, eg PVC. Said lamination may include hot melting a sheet of the transparent or clear material on each face of the substrate to sandwich and encase the substrate between the sheets. Instead, the sheets of transparent material may be glued, eg in an oven, on to the substrate. The method may include cutting the laminate to a required size corresponding to the size of a personal information-bearing card.

The method may include capturing the image by means of a camera and feeding the image into a computer. The method may include selectively adding data, eg text, to the image by means of the computer.

The thermoplastic polyester carrier film may have a relatively higher heat resistance than the substrate. Preferably, the carrier film has a thickness of about 90 - 110 μ m. Typically, an untreated, anti-static, clear polyethylene terephthalate (PET) film having a thickness of about 100 μ m, which is available under the name MALINEX 538 from ICI South Africa (Proprietary) Limited, is used.

According to a further aspect of the invention, there is provided an apparatus for producing a personal information-bearing card in accordance with the method hereinbefore described, the apparatus including

a camera for capturing an image to be transferred to the card;

computing means configured to interface with the camera and receive the image from the camera;

a laser printer configured to interface with the computing means and receive at least the image from the computing means, the laser printer being operable to print a mirror image of the image onto a surface of a thermoplastic polyester carrier film which has a thickness of 70 - 150 μ m; and

transferring means which has a heating device and a pressure generating device, the transferring means being operable to transfer the mirror image from the carrier film onto a surface of a substrate, wherein the transfer is effected at a temperature of 135 °C - 170 °C by placing the image-bearing surface of the carrier film in flat abutment with the image-receiving surface of the substrate and applying heat and pressure to the carrier film and the substrate thereby to produce the personal information-bearing card.

The apparatus may include laminating apparatus for laminating the card.

The computing means may include suitable hardware and/or software to enable it to be interfaced to the camera and the laser printer.

The heat and pressure may be applied by means of a heat and pressure roller laminator or by means of a hot press, eg an iron. The Applicant has found that image transfer takes place effectively at a temperature of about 145 - 170°C and most effectively at about 155°C. Instead, when the receiver substrate is in the form of a pre-produced card blank, heat and pressure can be applied by means of a baking oven, such as the type available under the trade name "CARD JET".

When the receiver substrate is in the form of a pre-produced card blank, the apparatus may include a containing frame which is operatively positioned about edges of the card blank when applying heat and pressure. The containing frame is adapted to surround the card blank snugly, thereby inhibiting the card blank from flowing laterally or distorting when subjected to the heat and pressure in the baking oven.

The card blank can be supplied in batches containing a plurality of card blanks. The Applicant has found that the dimensions of the card blanks vary from batch to batch and, accordingly, the method may include manufacturing the containing frame to be complementary to the dimensions of the card blanks contained in a particular batch.

The invention extends to a personal information-bearing card, whenever produced in accordance with the method described above.

The invention further extends to a containing frame for use in the above method.

The invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings in which:

Figure 1 shows a method of and apparatus for producing a personal information-bearing card, in accordance with the invention.

Figure 2 shows a schematic representation of a method of and apparatus, in accordance with the invention, for producing a personal information-bearing card using a pre-produced card blank; and

Figure 3 shows a three-dimensional exploded view of a containing frame being positioned to surround snugly a card blank.

With reference to the drawings, a method of producing a personal information-bearing card, in accordance with the invention, in the form of an identity card is generally indicated by reference numeral 10.

An image 12, typically such as that used on an identity card, is captured by a camera 16 and is then fed into computing means in the form of a computer 14. The computer 14 has suitable hardware and software to interface with the camera 16 and receive from it the image 12. Data in the form of text (not shown) is selectively added to the image via the computer keyboard 19. A laser printer 18 is interfaced with the computer 14 and the image is then sent to the laser printer 18 from the computer 14. Accordingly, the computer

includes the software and hardware which is known in the art to interface it to both the camera 16 and the laser printer 18 eg a graphics package, a dedicated applications program, or the like.

Advantageously, the laser printer 18 is a state of the art laser printer which is capable of printing with a resolution of 600 dots per inch eg an Hewlett-Packard HP4 laser printer. In certain circumstances an imaging enhancement card is included in either the laser printer 19 or the computer 14 to improve the resolution of the printed image, eg to 2000 dots per inch. Typically, the card is eg a LASER PIX™ card.

The image 12, which includes the text or other data that is selectively added thereto, is then reverse printed, ie in mirror image fashion, onto a surface 20 of a thermoplastic polyester carrier film 22 which has a thickness of 90 - 110 μm .

The thermoplastic polyester carrier film 22 is typically an untreated, anti-static clear polyethylene terephthalate (PET) film and typically has a thickness of about 100 μm eg MALINEX 538 which is available from ICI South Africa (Proprietary) Limited. The carrier film 22 is loaded into the laser printer 18, without modifying the printer 18, and the image 12 is then reverse printed onto the carrier film 22. The image 12 is thus formed by the toner used by the laser printer 18.

Once the image 12 has been printed onto the carrier film 22, the carrier film 22 is placed onto a polymeric receiver substrate in the form of a receiver film 24 such that

the image-bearing surface 20 of the carrier film 22 abuts flatly with a flat surface of the receiver film 24. Typically, the receiver film 24 is PVC.

Once the carrier film 22 has been placed onto the receiver film 24, both films 22, 24 are passed through a heat and pressure roller laminator 26. The heat and pressure applied by the laminator 26 are pre-determined according to the material of the carrier and receiver films, 22 and 24, respectively, so that the image is caused to transfer from the carrier film 22 onto the receiver film 24. The transfer is effected at a temperature of about 135 °C to about 170 °C, preferably at about 155 °C. Once transfer of the image 12 has taken place, the image 12 on the receiver film 24 is a natural image and not a mirror image.

After the receiver film 24 and carrier film 22 have been passed through the heat and pressure roller laminator 26 (see Figure 1) and image transfer has taken place, the carrier film 22 is removed.

The receiver film 24 is then encased by lamination between two layers of a compatible PVC transparent material, similar to the receiver film PVC material, by means of a hot melt process known in the art which is schematically represented by reference numeral 30. The laminate is then cut to a required size by means of a punch 28, or the like.

In the embodiment of the invention depicted in Figures 2 and 3, the polymeric receiver substrate is in the form of a pre-produced card blank 25. Once the image has been printed onto the carrier film 22, the carrier film 22 is placed onto the card blank 25 such that the image-bearing surface 20 of the carrier film 22 abuts flatly with a flat surface of the card

blank 25. The pre-produced card blank 25 is typically in the form of a smart card blank, WIEGAND (trade name) card blank, transponder card, or the like.

Once the carrier film 22 has been placed onto the card blank 25, both are positioned in a baking oven 26 such as the type available under the trade name "CARD JET". Heat and pressure is transferred to the carrier film 22 and the card blank 25 by positioning them, in face to face parallel abutting relationship, intermediate two heat and pressure plates of the baking oven and bringing the plates together, and image transfer is effected at a temperature of about 135 °C to about 170 °C, typically at about 155 °C.

As can best be seen in Figure 2, the method includes positioning a containing frame 28 around the card blank 25 prior to subjecting the card blank 25 to heat and pressure. The containing frame 28 is configured to snugly surround the peripheral edges 25.1 of the card blank 25 so that when the card blank 25 is subjected to heat and pressure, for image transfer from the carrier film 22 to take place, the card blank 25 is contained by the containing frame 28, thereby inhibiting the card blank 25 from deforming or distorting as a result of the application of heat and pressure.

The Applicant has found that such a pre-produced card blank can be supplied in batches together with a plurality of similar card blanks. However, the dimensions of the card blanks vary from batch to batch. Thus, each frame 28 is manufactured to be dimensionally complementary to the card blank of a particular batch.

It will be appreciated that the containing frame 28 can be made by making use of conventional techniques eg by means of an erosion cutting process, by using a milling machine, or the like, and can be made from any suitable material eg aluminium plate.

As previously indicated, the invention is not limited to the production of an identity card. It is to be appreciated also that the image need not necessarily be a facial image but extends to eg a finger print. It is further to be appreciated that, together with the image, other particulars eg an identity number, or a driver's licence number, or the like, may be read into the computer by means of eg a computer keyboard, and which can be added to the image by means of the computer and can further be printed together with the image onto said carrier film. Also, magnetic strips, logos, bar codes, etc can be incorporated into the card, eg during the lamination process. In this way a variety of personal information-bearing cards can be produced, eg a driver's licence card or credit card, or the like.

CLAIMS

1. A method of producing a personal information-bearing card, the method including
printing an image, mirror image fashion, by means of a laser printer onto a surface
of a thermoplastic polyester carrier film which has a thickness of 70 - 150 μm ;
placing said image-bearing surface on and in flat abutment with a surface of a
polymeric receiver substrate; and
applying heat and pressure to the carrier film and the substrate while in flat abutment
with each other thereby transferring the image from the carrier film onto the abutting surface
of the substrate, wherein the transfer is effected at a temperature of 135 $^{\circ}\text{C}$ - 170 $^{\circ}\text{C}$.
2. A method as claimed in Claim 1, in which the substrate is of a thermoplastic
polymeric material having a melting point of 90 $^{\circ}\text{C}$ - 200 $^{\circ}\text{C}$.
3. A method as claimed in Claim 1 or Claim 2, in which the image is transferred onto
the surface of a substrate which is in the form of a pre-produced blank card.
4. A method as claimed in Claim 3, which includes locating a containing frame around
the blank card prior to applying heat and pressure thereby to minimise deformation of the
card.
5. A method as claimed in any one of Claims 1 to 4 inclusive, which includes removing
the carrier film from the substrate after image transfer and then laminating the substrate with
at least one sheet of transparent material.

6. A method as claimed in any one of the preceding claims, which includes capturing the image by means of a camera and feeding the image into a computer.
7. A method as claimed in Claim 6, which includes selectively adding data to the image by means of the computer.
8. Apparatus for producing a personal information-bearing card in accordance with the method as claimed in any one of Claims 1 to 7 inclusive, the apparatus including
 - a camera for capturing an image to be transferred to the card;
 - computing means configured to interface with the camera and receive the image from the camera;
 - a laser printer configured to interface with the computing means and receive at least the image from the computing means, the laser printer being operable to print a mirror image of the image onto a surface of a thermoplastic polyester carrier film which has a thickness of 70 - 150 μm ; and
 - transferring means which has a heating device and a pressure generating device, the transferring means being operable to transfer the mirror image from the carrier film onto a surface of a substrate, wherein the transfer is effected at a temperature of 135 °C - 170 °C by placing the image-bearing surface of the carrier film in flat abutment with the image-receiving surface of the substrate and applying heat and pressure to the carrier film and the substrate thereby to produce the personal information-bearing card.
9. Apparatus as claimed in Claim 8, which includes laminating apparatus for laminating the card.

10. Apparatus as claimed in Claim 8 or Claim 9, in which substrate is in the form of a pre-produced card blank, the apparatus including a containing frame which is operatively positioned about edges of the card blank when applying heat and pressure.

11. A new method of producing a personal information-bearing card, substantially as described and illustrated herein.

12. A new apparatus for producing a personal information-bearing card, substantially as described and illustrated herein.

Application number
GB 9416541.2

13

Search Examiner
A DAVEY

(ii) Int Cl (Ed.5) B41M: 5/025, 5/03, 5/035, 5/34; G03G: 13/14, 13/16

Date of completion of Search
24 NOVEMBER 1994

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant
following a search in respect of
Claims :-
1 TO 7, 11

(ii) **ONLINE DATABASE: WPI**

X: Document indicating lack of novelty or of inventive step.

P: Document published on or after the declared priority date but before the filing date of the present application.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

A: Document indicating technological background and/or state of the art.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2273466 A (BYGRAVES)	
A	EP 0410800 A2 (XEROX)	
A	WO 83/04092 (DATA CARD)	